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CACTUS AND SUCCULENT JOURNAL

Of the Cactus And Succulent Society Of America

Vol. III OCTOBER, 1931 No. 4

Courtesy Pacific Mutual News. Willard Photo.

The Ocotillo in full leaf and bloom in the Colorado Desert.

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CACTUS AND SUCCULENT JOURNAL

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THE CACTUS AND SUCCULENT SOCIETY OF AMERICA

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Euphorbia abyssinica

By G. A. FRICK

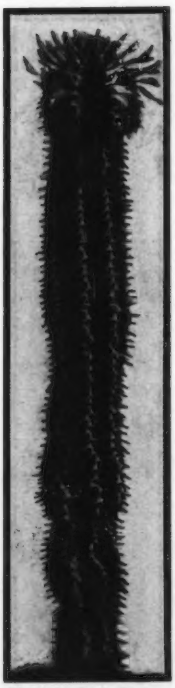


Photo by B. L. Sloane.

A mystery that has been somewhat annoying to collectors of Euphorbias in recent years has been solved through a search of the library of Mr. William Hertrich of the Huntington Botanic Gardens, San Marino, Calif. The information gained is that *E. grandis* is a synonym of *E. abyssinica.* Seeds received at the Torrey Pines Acclimatization Station in San Diego County were sent out by the U. S. Department of Agriculture from Washington and were labeled *E. abyssinica.* When plants from these seeds were distributed to collectors it was found that they agreed with the description of *E. grandis* as given in Berger's Sukkulente Euphorbien and known under this name today in most collections where they are held in high esteem.

It was found that the oldest name is *E. abyssinica* which, therefore, has priority and is the correct one to apply to this species.

Another name applied to *E. abyssinica* was *E. neutra;* this is a very similar plant but not the true *E. abyssinica* as we know it in California, and pictured herewith.

Another error of Berger's that contributed to the confusion was that his description of *E. abyssinica* Raeuschel does not agree with this plant but should apply to *E. neglecta* N. E. Br. *E. abyssinica* var. *tetragona* Schweinfurth described in this same work is also a synonym and belongs to *E. acrurensis* N. E. Br. *E. acrurensis* is identical with plants sold by German dealers in succulents as *E. abyssinica,* cuttings of which have recently been sold throughout California by Mr. Ramberg, he having discovered and purchased a tree found growing in a Southern California garden. Juvenile *E. abyssinica* plants are outstanding because of the beautiful markings of variegations in color. But like many seedling Euphorbias this is not constant and disappears after the plant is about five years old.

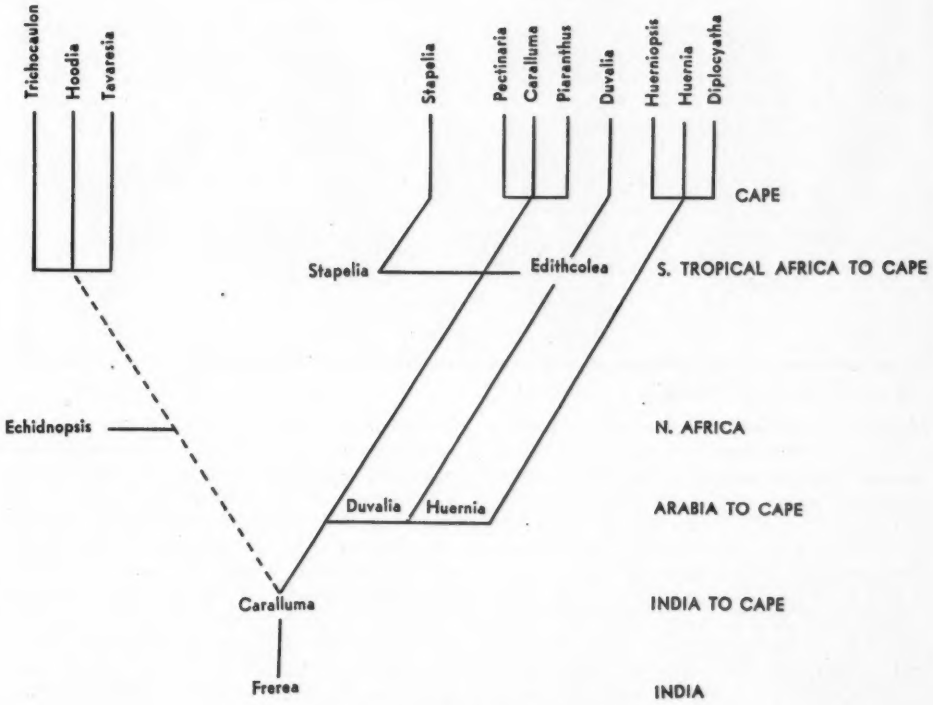


FIG. 3. Geographic Distribution Chart.

The Stapelieae

2. The Genera

By ALAIN WHITE *and* BOYD L. SLOANE

We mentioned last month the early interest in the Stapelieae of Francis Masson, who was sent out by Kew Gardens to South Africa in 1792 to study the little known flora of that region. In the book he published in 1796 Masson made no effort to subdivide the genus Stapelia, which Linnaeus had established; but he was a man of great acuteness and the sequence of his descriptions and illustrations shows that he sensed many of the distinctions which later botanists were to express. Thus he had six species of what are now called *Huernias,* and he grouped them all together. He had three *Duvalias,* and three *Piaranthus,* and these again he grouped together, and appropriately one group next the other. Of eighteen *Stapelias,* in the restricted sense of the present day, he grouped fifteen together, and it was only at the very end of his collection, among what are now the *Carallumas,* that there is the slightest deviation from the modern genera, his other three *Stapelias* appearing there out of sequence.

R. Brown, in 1809, first made a division among the *Stapelias,* establishing the genera

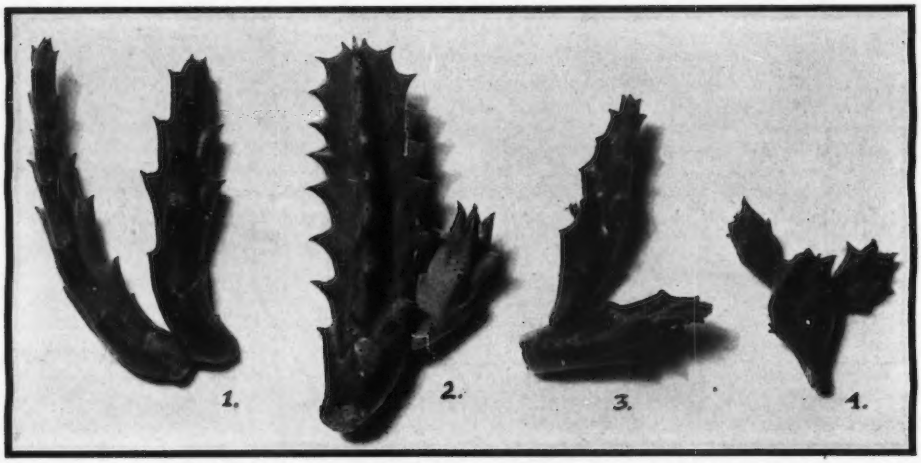


FIG. 4. Stems of Stapelieae: (1) Stapelia (Orbea); (2) Huernia; (3) Duvalia; (4) Piaranthus.

Huernia, Piaranthus and *Caralluma.* Haworth in the same year, and again in 1819, carried the subdivision further; and others have carried it on further still until the establishment of *Edithcolea* by N. E. Brown in 1895 completed the fourteen genera as we know them from his two Floras and from Berger's treatise.

These genera may be divided into three classes. First there is *Frerea* Dalz., the round-stemmed, leaf-bearing genus. Then there are nine genera, mostly with four to six ribs, whose period of growth for individual stems is usually limited to a single season; *Caralluma* R. Br., *Huernia* R. Br., *Huerniopsis* N. E. Br., *Diplocyatha* N. E. Br., *Edithcolea* N. E. Br., *Stapelia* L., *Pectinaria* Haw., *Duvalia* Haw., and *Piaranthus* R. Br. And there are four genera with a larger number of ribs, from six to thirty, which have in most species a continued growth of individual stems for more than one year: *Echidnopsis* Hook. fil., *Trichocaulon* N. E. Br., *Hoodia* Sweet, and *Tavaresia* Welw.

A geographical charting of these genera, as in Fig. 3, must begin in British India, with a mere dot to represent the spot near Hewra where, in 1865, Dalzell discovered the leaf-bearing *Frerea indica* Dalz. He found only this one species and it has not been collected again. Dalzell named it for the picturesque Sir Bartle Frere (1815-1884), who is remembered for his part in the Mutiny. He was Governor of Bombay at the time of Dalzell's discovery, and appropriately enough some fifteen years later became Governor General at the Cape.

From Bombay to the Cape just covers the extreme range of the Stapelieae, and this whole territory is the domain of *Caralluma,* not to mention its excursion around the Mediterranean into Southern Spain. Botanically also, *Caralluma* is the very backbone of the whole tribe. In general the genus has four-ribbed stems, comparatively tall and branching in the Indian species, becoming shorter, thicker and more rugged in Tropical Africa, and more sharply ribbed and more highly toothed as it approaches the Cape. There were nearly 80 species when N. E. Brown reviewed the African members of the genus in 1904-09, and more than a dozen others have been described since then. (The origin of the name *Caralluma* is aboriginal and its meaning is not known.)

The flowers of *Caralluma* are also varied. In the Indian species they are usually single and spaced irregularly along the stems. In Africa, clusters of flowers are frequent, and sometimes form great umbels at the ends of the stems. The corollas are all star-like, generally quite small, but in some species much larger and with lobes much more deeply cleft. A characteristic feature of the central crowns is the outer corona, which often has its five lobes intergrown into a little cup or bowl. Just such an outer corona, by the way, is found in *Frerea.* But the corona lobes of *Caralluma* show many modifications, which will be spoken of further next month, and in two species the outer corona is wholly absent.

Branching from *Caralluma* far to the north is *Huernia,* named for Justus Heurnius, an early plant collector at the Cape. N. E. Brown recognized over thirty species in 1909, and half a dozen or more have been described since then.

One is from Arabia, six or seven from Tropical Africa, and the rest from the south. The stems are mostly short and four or five angled, but there are striking exceptions; all are glabrous and many strongly toothed. The flowers are generally small and bell-shaped, and always immediately recognizable through having the corollas divided into ten points, instead of the customary five. They have the five regular tips of the lobes, as in the other genera, but between every two lobes there is another small but very distinct projection. The outer corona is disk-shaped with ten small lobes, but in one species it is wholly absent. The inner corona has a prominent horn, which takes on characteristic forms in several different groups of species.

Two genera, *Huerniopsis* and *Diplocyatha,* branch from the *Huernia* line at the Cape, each with a single species only. Both have inner coronas similar to the *Huernia* type, and the former received its name from this resemblance to the *Huernias.* In *Huerniopsis,* however, the outer corona is absent. The stems are short and recumbent, as are also those of *Diplocyatha.* This genus derives its name from two Greek words, meaning a "double cup". The reference is to the large inner ring, an outgrowth at the center of the corolla, which almost produces the effect of being a second corolla.

Another genus covering as long a range as *Huernia* is *Duvalia,* named for an early botanist. This also branches off in Arabia, with one species. It comes through Tropical Africa with a second, and reaches its fullest development in South Africa, where there are about fifteen others. The short stems have four to six ribs, with tuberculate surfaces, toothed and bearing two minute stipules at the base of the teeth. The flowers have the outer corona swollen to a thick disk, which rises from the center of the corolla and is surrounded by a little ring or thickening of the corolla itself. The effect is that of a round stone set in an odd star-shaped mounting. The corolla lobes are more or less folded back and sometimes appear like narrow vertical plates.

Piaranthus (the "fat flower", to translate its Greek name literally) has a stem very similar to *Duvalia,* with the same habit of growth and the two little stipules at the base of the teeth. There are about a dozen species, all native of the Cape. The flowers are very distinct from those of *Duvalia,* having no outer corona at all, while the inner corona generally has a thick dorsal crest at the base.

Returning again to the central backbone in the geographical chart, and following it down to Tropical Africa, there is a short branch, the genus *Edithcolea.* It is named for Miss Edith Cole, who discovered the first of its two species, *E. grandis* N. E. Br., in Somaliland about 1895. The stems are five ribbed and up to a foot tall, toothed, with the large flowers near their tips. The genus is distinguished by its remarkable inner corona, the lobes of which meet at their tips and there broaden out like a little roof over a diminutive summer-house. The *Edithcoleas* have not been successfully cultivated and are not found in American collections.

Branching off likewise in Tropical Africa is *Stapelia,* named for the Dutch physician, J. B. van Stapel. N. E. Brown enumerated fifty-six species in 1909, of which only three were from within the Tropics, the rest from the south. Since then twenty or more additional species have been described. While actually a smaller genus than *Caralluma,* the great number of varieties and hybrids make it appear much larger, and it is by far the best known of all the

FIG. 5 Stems (continued). (5) Stapelia (Stapeltonia); (6) Echidnopsis; (7) Caralluma.

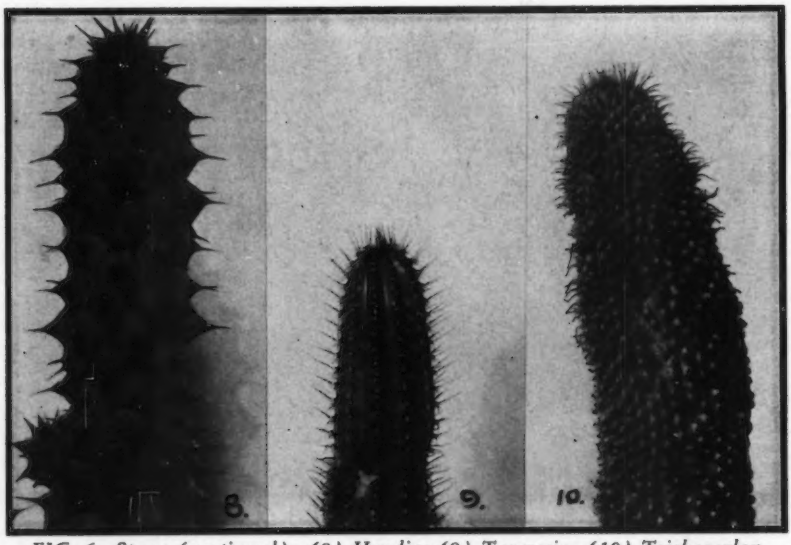


FIG. 6. Stems (continued). (8) Hoodia; (9) Tavaresia; (10) Trichocaulon.

genera to American collectors. The outer coronas of the *Stapelias* have lobes cleft to their base and free, but this basic character appears in so many forms as to be almost bewildering. Botanists have tried to classify the species into different subsections, and while these are not very exact at least two of them, the *Orbeas* and the *Stapeltonias,* refer to groups which are very characteristic, so that it is very convenient to adopt them, at least informally.

All *Stapelias* have four-ribbed stems, but where the *Orbeas* are generally smooth, the *Stapeltonias* are generally velvety. The *Orbea* stems are mostly short, the ribs separated by irregular sinuous depressions, while their surfaces are broken up into alternating protuberances which terminate abruptly in sharp points. The *Stapeltonia* stems are longer, the ribs straight and often noticeably folded back.

The flowers of the *Stapelias* generally have the corolla lobes fairly short in proportion to their width as compared with those of the most closely related *Carallumas. Orbea* flowers are immediately recognizable because of the raised ring on the corolla surface surrounding the central crown. *Stapeltonia* flowers are mostly larger than the *Orbeas,* and the section includes several of the largest flowers found anywhere in the whole tribe.

Caralluma and *Stapelia* approach the Cape in distinctly parallel lines. Between them is *Pectinaria,* a most interesting genus, with five species, all from the Cape. It is almost unknown in America, and has not flowered here. The stems vary, being very much tubercled in some species. The flower is unique in having the tips of the corolla lobes intergrown, forming a little basket arrangement. The name, which means "comb-shaped", may refer to this.

Of the many-ribbed genera of the Stapelieae the most northerly is *Echidnopsis.* The name is from the Greek and means "viper-like". It must not be confused with the name of the *Cactus* genus, *Echinopsis,* which means "hedgehog-like". Both names are very descriptive, and certainly the long, spineless, cylindric stems of the *Echidnopses,* with their six to ten angled surfaces, take on sinuous curves which are very snake-like. The flowers are small, with the corona irregular, sometimes single and sometimes double. The genus had seven species at the time of N. E. Brown's revision, of which one is from Arabia, the others from Abyssinia and Somaliland.

The three other many-ribbed genera share the territory from Tropical Africa to the Cape. *Trichocaulon* is the strangest of them, a dweller on rocky cliffs. N. E. Brown recognized a dozen species in 1909, and since then about ten others have been described, principally from Southwest Africa. Their thick stems assume very irregular forms, very different from those commonly associated with the tribe. The tubercles are usually tipped with bristles, from which the

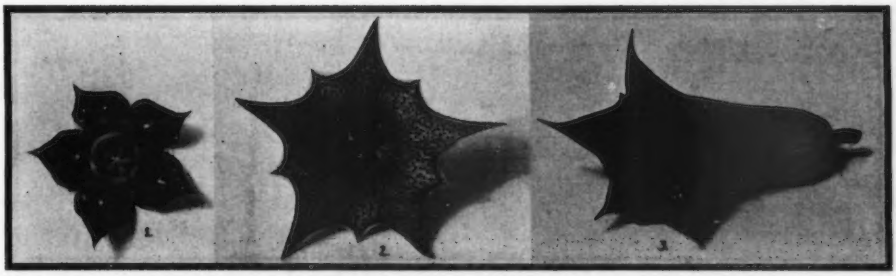


FIG. 7. Flowers of Stapelieae: (1) Duvalia; (2) Huernia; (3) Tavaresia.

genus derives its name of "hairy stem". The flowers are small and nearly related to *Caralluma.* They have not yet been seen in this country.

Related to *Trichocaulon* is *Hoodia,* with a dozen or more species. The stems are large and strong and harder than in the other genera. The ribs, which vary from 12 to 24 in number, are often irregular and are formed of tubercles tipped with stout spines. The flowers are very distinctive, the corolla lobes being so obtuse that the flower is almost perfectly circular, but for the small sharp projections at the tips of the lobes.

Last of all comes *Tavaresia,* the derivation of whose name has been forgotten, although it doubtless came from some proper name. There are only two or three species. The number of their ribs, from six to twelve, is less than in the *Trichocaulons* and *Hoodias* and their shape is somewhat straighter. The teeth are small and terminate each in three bristles, so distinct that any plant of the genus can be easily identified with the help of a magnifying glass. The flowers are large and funnel-shaped, and within their deep throat is a complex and extremely beautiful arrangement, the outer corona rising into ten long segments tipped with little hanging knobs.

In addition to the fourteen genera of N. E. Brown and Alwin Berger, mention should be made of a new genus described by Professor Kurt Dinter in 1922. This is *Sarcophagophilus* Dtr., named for its love of the rocky hills in South West Africa. Literally "Sarcophagos" means "flesh-eating", and the Greeks gave the name to the great limestone and other stone slabs of which their coffins were made, because they imagined these stones to have the power of consuming their dead. Of the two species in this new genus, one was transferred by Dinter from *Caralluma,* so we will postpone further reference to it until next month when we will reach the *Carallumas* and try to tell something of their remarkable variety and complexity.

In this month's illustrations the Trichocaulon of Fig. 6 and the Tavaresia of Fig. 7 are from the collection of W. I. Beecroft, Escondido and the Hoodia of Fig. 8 is from the collection of Dr. R. H. Pulleine, Adelaide, Australia.

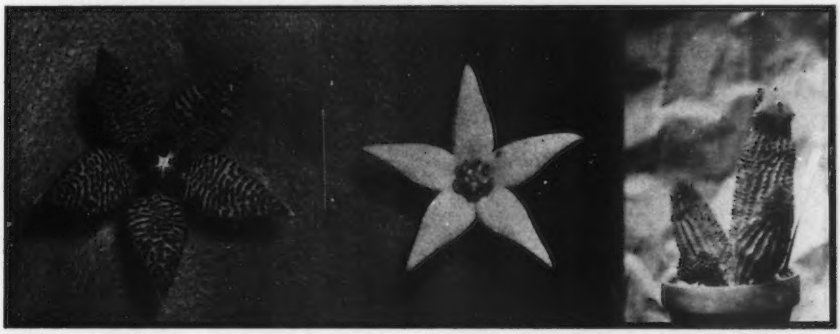
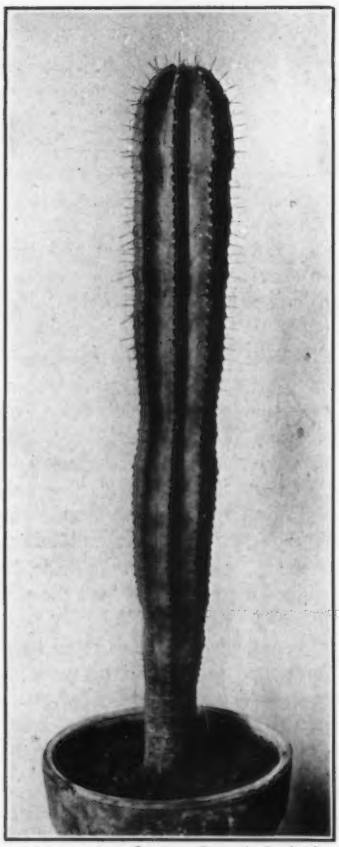


FIG. 8. Flowers (4-5) Piaran:hus, 3x nat. size; (6) Hoodia, x.25 nat. size.

CEPHALOCEREUS EUPHORBIOIDES (Haworth)

From the Cactaceae by Britton and Rose Vol. II, page 33



Courtesy Carnegie Institution

Cephalocereus euphorbioides

Cereus euphorbioides Haworth, Suppl. Pl. Succ. 75. 1819.
Cactus euphorbioides Sprengel, Syst. 2: 496. 1825.
Pilocereus euphorbioides Rumpler in Forster, Handb. Cact. ed. 2. 658. 1885.

Plant 3 to 5 meters high, columnar, usually simple; ribs 8, acute, somewhat crenate; areoles less than 1 cm. apart, white-felted; spines few, sometimes only 4 or 5, and then only 1 prominent, dark brown, porrect, about 1 cm. long; ovary 2 cm. long, spirally tuberculate; tubercles bearing triangular scales sparingly woolly in their axils, with 1 to 4 yellow spines; perianth-tube funnelform, campanulate, 4.5 cm. long; outer perianth-segments 15 mm. long, fleshy, reflexed, brown or reddish, brown, the inner ones 2 cm. long, reflexed, rose-red; flowers diurnal.

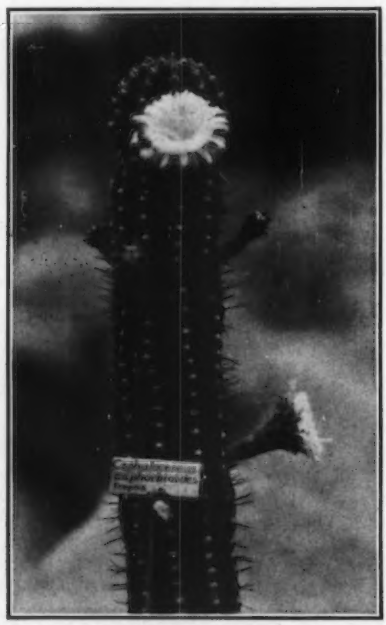
Type locality: Not cited.

Distribution: The Index Kewensis says South America; Schumann says Brazil, not Mexico; Rümpler says Mexico and tropical America. Known to us only from cultivated specimens.

Rümpler refers here *Cereus conicus* Hort. Berol. (Pfeiffer, Enum. Cact. 97. 1837), which Pfeiffer states is from Mexico. *Cereus olfersii* Salm-Dyck (Hort. Dyck. 335. 1834) probably belongs here. The Theodosia B. Shepherd Company, in their Descriptive Catalogue for 1916, describes briefly *Cereus olfersii* from Brazil as follows: "A magnificent *Cereus*, exceedingly stout growth; color light blue; beautiful spines which are jet black and very long."

Cereus polylophus is very similar in its habit and flowers to this species. Although Haworth did not know its origin, it is usually stated to have come from Brazil. In habit it resembles *Cephalocereus fluminensis*.

Illustrations: Monatsschr. Kakteenk. 17: 89, as *Pilocereus euphorbioides;* Rev. Hort. 57: 279. f. 47, 48, as *Cereus olfersii.*



Cephalocereus euphorbioides
Flowering in Mrs. Wright's garden Santa Barbara,

Courtesy Pacific Mutual News. Willard Photo

Typical Colorado Desert Scene

California Cacti

By E. M. BAXTER

These articles are a series concerning the known cacti of the State of California. They will contain descriptions of all the species, photographs of all species, and information on their habits, locations, etc., etc.

The author, through field studies, has made some conclusions that differ with the standard authorities. These are included, but with references to the accepted classifications.

Several new species have been made, either through raising of a variety to specific rank, or through new discovery.

New facts have been added, wherever possible, to the known data on each species. Some plants not generally credited to the State have been included.

Field trips have been made continuously, and several times to the same location to observe different aspects of the plant's growth. Wherever possible, the type locality has been visited to verify the identification of collected specimens.

There are still a number of older references that have not been reviewed, primarily because of their being inaccessible. Possibly some recent articles have been missed, especially in foreign periodicals. For these omissions, your pardon is begged.

This first installment is made up largely of keys and geographical discussion, but they are essential to the rest of the work.

The author will be pleased to receive comment on the articles, especially as to extensions of limits of plants.

Key to California genera ONLY. Not to be used for other sections.

Plants with spines and glochids, or glochids	*Opuntia*
Stems cylindric or club-shaped	*Cylindropuntia*
Stems circular and flattened	*Platyopuntia*
Plants with spines only, no glochids	
Plant stems with series of well-defined ribs	
Stems tall, to sixty feet or more	*Carnegiea*
Stems to five feet high, slender, spines yellow	*Bergerocactus*
Plants large, barrel-shaped or round	*Ferocactus*
Plants large, in clusters, apex wooly	*Echinocactus*
Plants small, 1 ft. high, red hooked, white unhooked spines	*Sclerocactus*
Plants relatively small, in clusters of few to 100 or more, spines all straight	*Echinocereus*
Plants stems with ribs divided into tubercles	
Tubercles grooved on upper surface	*Coryphantha*
Tubercles not grooved	
Root fleshy, carrot-like	*Phellosperma*
Root not fleshy	*Neomammillaria*

A key for each genus with more than one member will precede the presentation of that group.

CALIFORNIA CACTUS

Key to Genera

The forty-three species of native cactus are divided very unequally into ten genera. The genus *Opuntia* has a majority of the total, but its species are so diverse in form that there is not a monotony of appearance. The remaining genera are so distinct that little trouble need be experienced in classifying any given plant.

If we understand first the natural groupings of the whole cactus family, and then place our native species in their proper positions, we will have an insight into the "mystery" of classification.

The whole Cactus family is divided into three Tribes, Pereskieae, Opuntieae, and Cereeae. Their general distinctive features are:

Pereskieae — Their leaves mature and are large, the plant does not have glochids.

Opuntieae—Leaves small or falling off, the plant has both glochids and spines.

Cereeae—Leaves only on seedlings, the plant never with glochids.

The Pereskieae Tribe has only one member, the genus *Pereskia.* Pereskias are climbing vines or trees and grow native only in the tropics.

The Opuntieae Tribe has eight members, but only one of them—the genus *Opuntia*—grows in the western United States. It is the widest spread of any genus, ranging from northern Canada to southern Argentina, and has a greater range of forms than any other genus. Three subgenera are recognized in *Opuntia.* They are *Cylindropuntia, Tephrocactus,* and *Platyopuntia.* Only the first and last are found in North America. The *Tephrocactus* is generally globular in shape and is found only in South America.

The Cereeae Tribe is the largest in numbers and also in individual members. It has more than a hundred members, and each member of the tribe has from one to two hundred and fifty species in its group. The tribe is divided into several sub-tribes of which four are represented in California's cacti. In these four sub-tribes there are nine genera of native cactus.

GEOGRAPHY

Cacti are found only in the southern part of the State, from coast to eastern border. There are four general fields, each with its distinctive species.

The San Diego Area includes the territory from the Mexican boundary north to the Orange County line. Eastward it extends to the mountains separating the coastal plain from the Imperial Valley. Typical plants are *Ferocactus viridescens, Bergerocactus emoryi, Neomammillaria goodridgei,* and *Opuntia serpentina.*

The Colorado Desert Area includes Imperial, Riverside, and the southern part of San Bernardino County. Species found here are numerous, among the most typical being *Ferocactus rostii, Ferocactus acanthodes, Opuntia bigelovii, Opuntia ramosa, Opuntia parryi, Coryphantha deserti.* The "Ocotillo", *Fouquieria splendens,* is common in this area.

The Mojave Desert Area runs from about the San Bernardino Meridian north. It extends irregularly into Inyo and Kern Counties, and includes most of San Bernardino County, and the Antelope Valley portion of Los Angeles County. Typical plants are *Sclerocactus polyancistrus, Echinocereus mojavensis, Opuntia mojavensis,* and *Ferocactus lecontei. Echinocactus polycephalus* is found more frequently here than in the Colorado Desert Area.

Extending northwards are found *Opuntia cordata, Opuntia treleasei,* and *Phellosperma tetrancistra.*

The Northern Coastal Area includes the terri-

tory of San Bernardino, Riverside, Orange and Los Angeles Counties as far inland as the cities of Riverside and San Bernardino. Here is found no other genus but *Opuntia.* Among the species are *Opuntia littoralis, Opuntia parryi, Opuntia vaseyi,* and *Opuntia prolifera.*

In this Area are found other plants of interest to those who collect other succulents than cactus: Dudleyas, a Sedum, etc.

Many species extend over two and three of the areas. *Echinocereus engelmanni* is probably the most widespread. *Opuntia echinocarpa* and *Neomammillaria dioica* run close seconds. Further on, by each species, is given the extent of its distribution.

METHOD TO PREVENT THE GROWTH OF ALGAE IN SEED BEDS

Many persons have had considerable trouble in raising Cacti from seed because of the growth of Algae upon the surface of the seed beds and the ultimate death of all the plants surrounded by the growth. For those who may have had this trouble and may not have recognized it a few words describing the infection may be helpful.

The ideal conditions for the growth of the seedlings are plenty of moisture and temperature. These same conditions are also the best for the growth of Algae and in most water which is drawn from lakes or streams, especially during the warmer months, the Algae is present. When introduced into the seed beds by watering it finds ideal conditions and proceeds to multiply until the entire surface of the soil and extending up the sides of the seedling cacti is covered with a green scum which is quite tenacious and sticky. If the beds are kept wet for any length of time after the Algae have covered the soil the plants are sure to die. On the other hand, if the beds are allowed to dry out in an effort to check the Algae, the scum in drying cracks into small pieces and contracts, curling up as it does so and in most cases pulls the tiny seedlings right out of the soil and so they usually die anyway. From the above one can see that this is a problem that calls for a remedy just as the "damping off" fungus does.

I have found that the best, cheapest and easiest way to control this Algae is to treat the soil with minute quantities of copper and the method which I suggest is as follows:

The soil should contain a liberal quantity of lime in one form or another, but I think that powdered limestone is about as good as any. Just about the seeds are sown, say a day or so, the bed is well watered with water containing one ounce of copper sulphate commonly known as "blue vitriol" in 10 gallons of water. Simple, is it not? One must water the bed anyway and the addition of the copper sulphate offers no difficulties although the sulphate is slow in dissolving. Dissolve it in a small quantity of water by allowing it to set a day or so. Use a glass jar as the solution attacks most metals.

Once the copper solution has been used one will have no further trouble from the Algae until repeated waterings have washed the copper out of the soil and then all one needs do is replace it in the same way as originally. Do not try to overdo this treatment as all that is wanted of the copper is to kill the Algae and not to act as a fungicide. For a fungicide I find that Hammond's "Grapedust" is about as good if not better than all others for cacti. This material is obtainable in many florist supply houses, but in case one can not get it locally it may be obtained from the manufacturers: Hammond's Slug Shot & Paint Works, Beacon, N. Y.

EUGENE R. ZIEGLER,
Spencerport, N. Y.

What is a Succulent?

By JAMES WEST

At the recent San Francisco show there was on exhibition a plant of *Calandrinia grandiflora* bearing the label: "Is this a succulent?" Such questions as to whether some plant is or is not a succulent are not infrequent among us collectors. I think that the debates often arising out of such questions are caused mainly from a difference in the point of view among the debaters.

Whether or not a plant is of succulent habit, biologically speaking, is largely a question of fact. If it agrees with the concept of succulence as defined in a botanical handbook, has leaves or stems of greater thickness than the average, caused by the presence of water-storage tissue, it is a succulent. As is too often the case when we are trying to file away natural phenomena into the pigeonholes of human categories, there will always be doubtful instances just on the borderline, but, by and large, the question is capable of being answered by yes or no.

But, assuming the answer to be in the affirmative, this does not necessarily mean that the plant is suitable for inclusion in a collection of succulents, speaking horticulturally. We fanciers collect succulents primarily not to demonstrate a certain type of adaptive modification of structure but for their appearance, that definite form and curious beauty, rigid and sculptural, which we might venture to call "modernistic" in distinction to the "romantic" beauty of graceful flexibility found in ordinary plants.

So that we unhesitatingly exclude Begonias, Cabbages, Samphire or Sand Verbenas as well as a host of others which could well lay claim to being succulent in fact, without thereby being suited to ornament a fancier's collection. Sim-

ilarly, we *do* admit without much hesitation such plants as Yuccas, Furcraeas, many Bromeliads and Sedums although most of these are no more succulent than young roses, for instance, or many perennials. We do the latter for several reasons.

First an esthetic one: These plants seem to fit in by their general character of stiffness, or spininess or rosette-forming habit or general "queerness" of appearance unlike that of ordinary plants.

The second reason is a botanical one: *Pereskia pereskia* may not be any more succulent than a lemon tree, yet it is a member of that eminently and almost exclusively succulent family, the Cactaceae, and therefore interesting by virtue of its very unlikeness to such other members of the family as *Astrophytum myriostigma.* When you have it represented in your collection, it is always good for a little evolutionary lecture directed at the hapless uninitiated visitor, who may be told, when looking at *Euphorbia meloformis* or *Hoodia Dregei*: "This is not a cactus, but this" (pointing at the Pereskia) "is". Much the same can be said for a good many of the *Sedums* and *Crassulas* among the Crassulaceae, the *Ceropegias* among the Asclepiadaceae, etc. Membership in a family or genuis overwhelmingly succulent creates a presumption in its favor. In the instance of the *Euphorbias* the non-succulent species are too numerous for any of them to merit inclusion. In the present case of our *Calandrinia* the matter is a bit doubtful. Berger includes the *Calandrinias* among the Portulacaceae in his handbooks of succulent plants, not without expressing some doubt whether *Portulaca, Lewisia* and *Calandrinia* should rank as succulents equally with the unquestionedly succulent genera *Anacampseros* and *Portulacaria.*

The third reason is a cultural one; we will be more inclined to admit plants needing the same conditions of moisture and temperature as the majority. This makes us lenient towards a *Dasylirion* or a *Beaucarnea* while we blackball an encrusted *Saxifrage,* rigid, rosulate and no less "succulent" than they. The former make us think of the arid Mexican plain, the latter of the Alps of Switzerland. Yet the alpine Semperviva, also Swiss, are so indubitably succulent in fact, moreover crassulaceous, that we cannot well deny them entrance.

However, the line has to be drawn somewhere, unless indeed a general collection of xerophytes of all kinds is intended, in which case practically the entire flora of the arid regions of the world may lay claim to admission.

If you are a purist, you will draw this line to just exclude *Fouquieria* and *Idria,* if more lenient, you will allow them to masquerade as "succulents". In such doubtful cases, convention, tradition, long-established usage may perhaps be left to cast the deciding vote. If a certain species has for a long time, or among the majority of discriminating collectors, been considered as fit and proper to take its place among the chosen, we may (unless we be very, very exclusive) let it rest there.

Moral

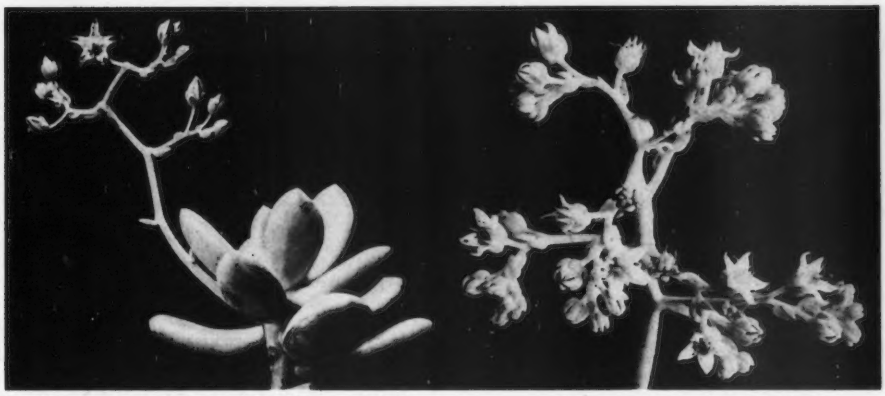
A plant is to be admitted to a place in a fancier's collection of succulents, if it

I. Actually is so highly succulent that there can be no doubt about it. In that case it matters not what it belongs to or where it comes from.

II. Is only moderately or even hardly succulent, providing it has several of the following qualities:
   a. Belongs to a family, genus or group consisting largely of commonly grown succulents;
   b. Has an appearance harmonizing with the majority of plants found in such collections, by virtue of more than one of the following characteristics:
      1. A certain minimum fleshiness of leaf or stem
      2. Rigidity
      3. Hard surface
      4. Spininess
      5. Rosulate habit
      6. A coloration departing noticeably from ordinary leaf-green (glaucous, brownish, etc.)
   c. Is amenable to the same conditions of culture as the majority, or distinctly a desert plant.
   d. Is by long usage or common consent among collectors considered to be a "succulent" by courtesy if not in fact.

To stimulate discussion among our readers, Mr. Victor Reiter of San Francisco has generously offered a plant of *Calandrinia grandiflora* as a prize to the contributor sending in the best reasoned essay of not over 150 words on the question whether that plant deserves a place in a collection of succulents.

The Editor will nominate a jury to decide on the winner. *C. grandiflora* is described in Berger's "Mesembrianthemen und Portulacaceen" and may be seen in Mr. Reiter's garden.



Plant flowering in collection of J. West . . . x 0.6

Fig. 3. *Graptopetalum amethystinum* (Rose) E. Walther.

Inflorescence . . . App. x 0.6

Fig. 4. *Graptopetalum weinbergii* (Rose) E. Walther.

More about Graptopetalum

By ERIC WALTHER

All photographs and drawings by Author

Little did the writer suspect, when last writing of the genus *Graptopetalum,* that another species would have to be added to the number cultivated in slightly more than a year's time. As already indicated in the recent article on *Pachyphytum* (*1) the strikingly colored plant long grown under the pseudonym *Pachyphytum amethystinum* Rose, is now definitely known to be another species of Graptopetalum. When publishing the original description of the species (*2) Dr. Rose carefully hinted that he was in doubt as to the correct generic affinities of the plant in question. Evidently only dried flowers were available to him at the time, and even these clearly showed the absence of the distinctive petal-appendages so characteristic of *Pachyphytum.* As may be seen from the present illustrations, the plant here discussed does indeed bear a most striking resemblance in its vegetative parts to such species of *Pachyphytum* as *P. bracteosum* and *P. oviferum.* Perhaps the long delay in recognition of its true generic status was due to its being shy-flowering, but after our friend West surprised us by the generous gift of a flowering plant, we found the species in flower also with Dr. Reticker and Mrs. Scannavino at Saratoga, in the order named.

One glance at the blossoms, with their widely spreading corolla-segments characteristically marked with transverse bands of dark red, is quite sufficient to convince anyone, not only that this can't possibly be a species of *Pachyphytum,* but also that no doubt can exist about its place in the genus *Graptopetalum.* In habit both of foliage and inflorescence, as well as in detailed structure of calyx, pedicels, carpels and scales, this species just as some others of the genus strongly resembles the Section *Paniculatae* of the genus *Echeveria,* a similarity possibly more than a mere coincidence. Within the limits of this single and otherwise well-marked genus one finds the vegetative characters of *Echeveria* and *Pachyphytum* combined with a floral structure reminiscent of *Sedum, Stylophyllum, Thompsonella,* etc. One might waste much time in idle speculation as to the origin of these undoubtedly closely allied genera, but much more evidence, anatomical, cytological, genetic and from the field, is needed before any final pronouncement becomes possible. The shape of the pollen-grains also is deserving of notice. In *Graptopetalum* these are of the oblong-cylindroid shape found also in *Sedum* and most other genera of the *Crassulaceae,* whereas in both *Pachyphytum* and *Echeveria* they are, as far as known, always of a shape perhaps best described as tetrahedroid-spheroid; that is to say, approximately globular with four equidistant projections.

By reason of its habit and foliage, *Grapto-*

*1: Cactus Journal, Vol. III, No. 1, page 9-13, July, 1931.
*2: In "North American Flora," Vol. II, part 1, page 11, 1905.

petalum amethystinum would come nearest to *G. weinbergii* and *G. pachyphyllum* in our key to the species (*3). From the latter it differs in habit, larger leaves and its more prominently marked petals. Its resemblance to *G. weinbergii* is even closer. This is perhaps better known as *Echeveria weinbergii* or *E. arizonica;* and by Dr. Rose was erected into the monotypic genus *Byrnesia.* In order to show its true relationship we take this opportunity of presenting a photograph of its inflorescence and a scale-drawing of one flower and its parts. As already noted elsewhere, Berger agreed with us in also placing this with *Graptopetalum,* even though considering this a mere section of *Sedum,* a treatment we consider quite untenable.

G. amethystinum differs from *G. weinbergii* in its blunter, narrower and more turgid leaves, fewer-flowered inflorescence, much more prominently marked and more widely spreading corolla-segments, the latter without any distinct subapical mucro (*4), carpels more abruptly narrowed into styles, and thicker scales. We append a description rather more ample than that given by Dr. Rose, l.c., quoting his characters in *italics*. It will be seen that these absolutely agree with our plant, no doubt remaining as to its identity. As mentioned in our description, the stamens exhibit the same peculiarity of turning away from the stigmas before the latter reach receptivity, a feature undoubtedly intended to prevent self-pollenization. The pollen is strongly foetid or musty, recalling the staminate flowers of the Chestnut or of *Ceratonia siliqua.*

Cultural requirements of this are identical with those of *Echeveria* or *Pachyphytum.* It will thrive in any good, well-drained soil, and appreciates adequate moisture during its growing season. It is no more frost-resistant than most species of *Pachyphytum,* so that shelter provided by an overhanging branch, a wall or rock, or an elevation would be advisable. In the absence of viable seeds, propagation is best accomplished by separation of basal offshoots or by careful detachment and rooting of single leaves.

The striking amethyst coloration of its foliage should make this a desirable addition to all comprehensive or choice collections of succulents.

*3: Cactus Journal, Vol. I, page 185.
*4: Compare Fig. 1d with 2d.
*5: The appendages found on the petals of *Pachyphytum* are outgrowths of the corolla-segments and not of the filaments, even though the latter are adnate to the corolla at that point.

GRAPTOPETALUM AMETHYSTINUM (Rose)
New Combination

(*Pachyphytum amethystinum* Rose, North Am. Flora, 22:1:11; 1905.)

(Family CRASSULACEAE, Subf. ECHEVERIOIDEAE)

(Type-locality: Top of Sierra Madre west of Bolanos, Jalisco, Mex.)

PLANT *shortly caulescent, to 1 dm. high or more;* STEM decumbent with age, branching near base;

LEAVES *scattered* near upper end of stem, *very thick but flattened, oblanceolate* to elliptic-obovate, *obtuse* or obscurely pointed, *about 4 cm. long* and 2 cm. broad, *glaucous with beautiful amethyst tinge,* in reality their exact color is most difficult to define, being a combination of an approximately greenish-glaucous or gnaphalium-green groundcolor with an overlaid tinge of light vinaceous-lilac or pale purplish-gray, the final effect differing in accordance with time of day, nature of light, cultural conditions, eyes and mental attitude of observer, etc.; the color-nomenclature here used being that of Ridgway;

INFLORESCENCE lateral, axillary, more or less *compound,* with 3 to 9 secund-racemose branches of 3 to 6 flowers each;

PEDUNCLES ascending, pinkish-vinaceous;

BRACTS few, similar to leaves but much smaller, to 6 mm. long, early deciduous; (*Pachyphytum* often has very large bracts);

PEDICELS *slender,* ascending, the lowest to 15 mm. long;

CALYX *5-lobed, lobes, ovate, almost acute,* appressed, somewhat unequal, the longest to 4 mm. long and nearly as long as corolla-tube, turgid, colored as the leaves but rather more glaucous;

COROLLA *cleft to below the middle but with distinct tube longer than calyx,* to 16 mm. in diameter, strongly pentagonal in bud;

SEGMENTS deltoid-lanceloate, rotate-spreading above, more or less keeled on back and channelled on face, especially towards the upcurved tips, *without any* trace of *appendages* at base of filaments, color *bluish in herbarium-specimens,* in living material with basal color of pale viridine-yellow to light yellow-green, marked in the outer ⅔ with more or less regular transverse bands of carmine to morocco-red that are almost completely confluent at apex; the color being confined to definite groups of epidermal cells;

STAMENS *not appendaged* (*5), longer than the pistils, when the flower first opens they are somewhat spreading, those opposite sepals first become erect and dehiscent, a stage not reached by those opposite petals until a day later; after the pollen is shed and before the stigmas become receptive the filaments strongly recurve so that the old stamens ultimately project from between the corolla-segments;

ANTHERS light buff before dehiscence, pollen foetid, grains oblong-cylindroid;

CARPELS pale viridine-yellow, slender, above rather abruptly narrowed into the short;

STYLES; these, as well as the slightly capitate stigmas, colored as the remainder of the pistils, or slightly cinnamon-rufous;

HYPOGYNOUS SCALES very small, transversely reniform;

FRUITS as yet unknown.

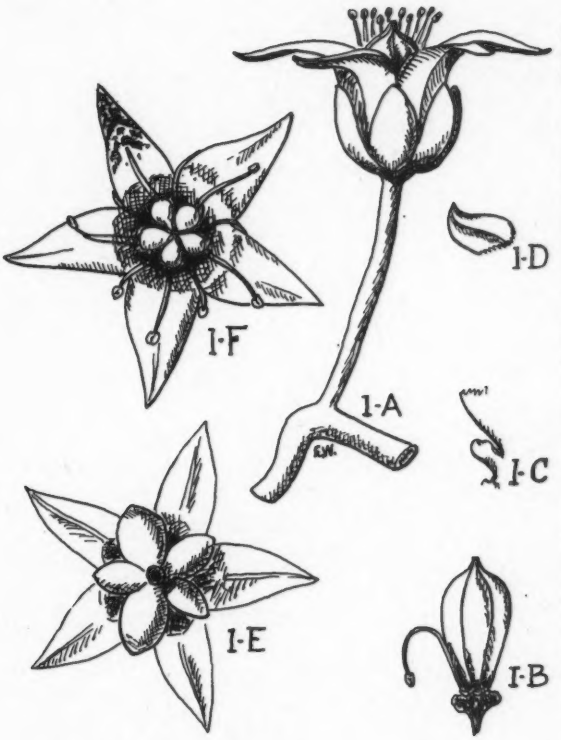


FIG. 1—GRAPTOPETALUM AMETHYSTINUM (Rose) E. Walther.

a. Single flower, side-view . . . . x 3
b. Carpels . . . . . x 3
c. Hypogynous scale . . . . . x 9
d. Tip of petal . . . . . x 9
e. Corolla and Calyx from below . x 3
f. Corolla from above . . . . . x 3

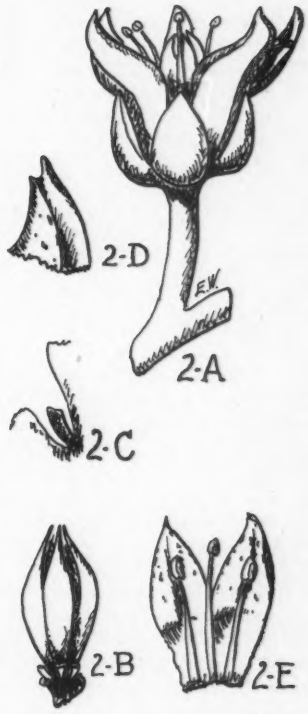


FIG. 2—GRAPTOPETALUM WEINBERGII (Rose) E. Walther.

a. Side-view of single flower . . . x 3
b. Carpels . . . . . x 3
c. Hypogynous scale . . . . . x 12
d. Tip of petal . . . . . x 9
e. Inside of 2 corolla-segments . . x 3

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APPRECIATION

A copy of Britton and Rose *Cactaceae* Vol. I, has been secured for the Society Library and this gift from Alain White completes the fourth volume of the set which he has presented to the Society. The Society appreciates Mr. White's interest in the work we are undertaking. A great many readers of the JOURNAL have expressed their interest in the Stapelia articles and all agree that Mr. White is "doing an excellent work in a hitherto undeveloped field." If you have any material on Stapelias, be sure to communicate with Mr. White and his co-worker, Boyd L. Sloane, 1421 Dominion Avenue, Pasadena.

A NEW SERIES OF ARTICLES

Our Opuntia expert, E. M. Baxter of Bellflower, has prepared a series of articles on California Cacti, or Cactuses as he prefers to call them. Nevertheless, we do know that these articles will be of great value and interest and include much original material. They are written for both amateur and professional and will be published in pamphlet form in the near future. This is the second series of original articles which will be welcomed in pamphlet form—Mr. White's series being the first, *The Stapelieae,* and now Mr. Baxter's *California Cacti.*

ENLARGED CACTUS JOURNAL

We are glad to announce that the JOURNAL will continue its 24 pages which is four more pages than last year. In the near future we hope to increase it to 32 pages. The steady increase of contributors is a healthy condition and as soon as the membership increases to 1500 we can adopt the 32-page size.